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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,421	03/12/2004	Jorgen Staal Nielsen	LAMA122574	7125

26389   7590   10/16/2007
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EXAMINER
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ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
10/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after t he mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09/18/2007</u>.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 16* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 12, 14 - 15* is/are rejected.

7)☒ Claim(s) *13 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All   b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 3, 5 - 12 and 15 are rejected under 35 U.S.C. 102(b) as being

anticipated by De Gaudenzi et al. (*"Signal Recognition and Signature Code Acquisition*

in CDMA Mobile Packet Communications, IEEE Transactions on Vehicular

Technology", Vol 47, No.1, February 1998).

Re claim 1, De Gaudenzi teaches of a telecommunications apparatus (Fig.2a, 2b),

comprising: a multi-finger Rake receiver (Page 196, Col 2, Line 1) having a serial stage

and a parallel stage (S/P, Fig.2b) having parallel branches, the parallel branches ($p_0(h)$,

$p_1(h)$...$p_{L-1}(h)$) being weighted by weighting factors ($\dfrac{n_1 - n_0}{\sigma_0^2}$, equation, Page 201); and a

single bit quantizer (Abstract, Line 17 and Fig.2a, 2b) on the serial stage (before S/P),

the single bit quantizer having single bit output; and the weighting factors being

generated by estimated probabilities of the single bit output from the single bit quantizer

$(\dfrac{n_1 - n_0}{\sigma_0^2}$, equation 23, see also equations 16 and 17, Page 201).

Re claim 2, De Gaudenzi teaches of pulse samples from the single bit quantizer have estimated probabilities (Page 200, Col 1, Lines 1 – 5) corresponding to different delays (code-phase shifts δ, Page 200, Col 1, Lines 5 – 11, equation (15)); and the weighting factors used in the Rake receiver are derived from the estimated probabilities of the corresponding pulse samples (equations (16) – (23)).

Re claim 3, De Gaudenzi teaches of the weighting factors are derived from a ratio (Page 201, equation (20)) of the estimated probability of a corresponding sample ($fz|H_1(z)$, equation (18 - 20)) at the nth delay (Lth delay) and the estimated probability that there is not a corresponding sample ($fz|H_0(z)$, equations (18 - 20)) at the nth delay (Lth delay).

Re claim 5, De Gaudenzi teaches of the single bit quantizer using a decision statistic (equation (26)) summed over samples of a received signal (Page 202, Col 1, Paragraph 1, Lines 1 – 6, equation (25)) to determine whether a symbol is present (H_1, H_0, Fig.2b, equation (26), Page 201, Col 1, Paragraph 2, Lines 1 – 6).

Re claim 6, De Gaudenzi teaches of the decision statistic (equation (23)) using a sum of a constant (1st part of equation is constant) plus a function that depends on estimated probabilities of samples of the received signal being greater or less than a threshold (3rd part of equation, see also equation (24 and 26)).

Re claim 7 and 9, De Gaudenzi teaches of M-ary or 2-ary encoding/modulation scheme (QPSK, Page 197, Col 1, Paragraph 2). Both M-ary or 2-ary and QPSK are phase shift keying modulation techniques.

Re claim 8, De Gaudenzi teaches of the single bit quantizer analyzes a weighted sum of samples from a received signal to determine whether a symbol has been received ($Z_{max}(h)$, Fig.2b, summer shown, equation (25)).

Re claim 10, De Gaudenzi teaches of the single bit quantizer determines presence of a symbol in a received signal based on a maximum weighted sum of samples ($z_{max}(h)$, Fig.2b) of a received signal (equation (26) and Fig.2b).

Re claim 11, De Gaudenzi teaches of the single bit quantizer operates using a search bin ($z_{max}(h)$, Fig.2b) to determine presence of a symbol in a received signal (see

claim 5), and shifts a search bin (estimate time shift $\hat{\delta}(h)$, Fig.2b, Page 198, Col 1, Paragraph 1 – 2) based on the estimated probability of a corresponding sample (equation (25)) at the nth delay (L_{th} delay).

Re claim 12, De Gaudenzi teaches of the single bit quantizer using a clock synchronizing scheme using metrics with a set of tracking rules (Page 202, Col 1, Paragraph 4), where the metrics are based on a sum of magnitudes of a set of samples of the estimated probability of a corresponding sample at the nth delay (Page 202, Col 2, equations (27) – (29)).

Re claim 15, De Gaudenzi teaches of the receiver using a single bit quantized pilot signal to estimate propagation channel characteristics (CDMA uses pilot symbols to estimate channel conditions, Page 196, Col 1, Lines 8 – 17), whereby weighting coefficients (see claim 2) may be derived for the Rake receiver (Page 196, Col 2, Line 1) by operating on received data samples.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over De

Gaudenzi in view of Agrawal et al.(US 6,366,600).

De Gaudenzi teaches all the limitations of claim 1 except of on-off keying.

Agrawal teaches of a spreader architecture for direct sequence spread spectrum

communications, which performs OOK, BPSK, or QPSK spreading modulation of a

carrier. In the OOK mode, the spectrum of the baseband components is selectively

spread according to the input data. The various modulation modes are used to encode

the control and traffic channels of a code-division multiple-access cellular telephone system (Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used OOK to reduce circuit complexity, gate count, and power consumption by using a single spreader architecture that is capable of spreading the spectrum of a baseband data signal depending on the levels of the spreader control lines (Col 2, Lines 30 – 35).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Gaudenzi in view of Crawford (US 6,549,561).

De Gaudenzi teaches all the limitations of claim 1 as well as channel allocation in a CDMA network (pilots symbols). However, De Gaudenzi does not specifically teach of pilot tracking decision feedback.

Crawford teaches of an OFDM receiver using pilot phase tracking loop. The phase noise introduced by a radio portion of the OFDM receiver and an OFDM transmitter is compensated for by the pilot phase error estimation in the baseband portion of the OFDM receiver (Abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have used a pilot tracking decision feedback for improved signal tracking is accomplished under poor SNR conditions (Abstract, Lines 15 – 16).

Allowable Subject Matter

Claims 13 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed September 18, 2007 have been fully considered but they are not persuasive.

Applicant has submitted that IEEE paper of De Gaudenzi states that single bit ADC sampling can be used but thereis no discussion of how these single bit samples are combined to use as RAKE weights.

Examiner has specifically cited above in the rejection of claim 1, the weighting factors as seen in equation 23 of De Gaudenzi where the weighting is generated by estimated probabilities of the single bit output from the single bit quantizer ($\frac{n_1 - n_0}{\sigma_0^2}$, equation 23, see also equations 16 and 17, Page 201) where n_1, n_0 and σ_0, are computed in equation 17 from the statistics of $z_i(h)$.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aristocratis Fotakis whose telephone number is (571) 270-1206. The examiner can normally be reached on Monday - Thursday 7 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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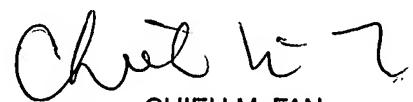
CHIEH M. FAN
SUPERVISORY PATENT EXAMINER